Adding a Second Water Heater

by Dave Yates

One of the first things done by the average homeowner who is running out of hot water is to turn up the thermostat on the storage tank. This actually makes some sense because less hot water is required to achieve the same mixed temperature ratio. Raising the storage temperature from 120°F to 140°F will increase energy costs for a standard water heater just $12 per year on average. However, if the problem is really one of insufficient volume, the only practical solution is to install a bigger water heater.

Adding a new bedroom, or a jetted tub, or a multihead "spa" shower are all good reasons to increase a home's existing hot-water supply. One solution is to install a separate, dedicated water heater to handle the new outlet. But depending on the extent of the re-routed distribution lines, installation of a separate stand-alone water heater can cost at least $900. Swapping out the too-small heater for a larger unit is another alternative, but the drawback is that the cost of the tank and its installation can easily exceed $1,500. Provided that the existing water heater is relatively new and functions properly, we often recommend adding a second heater and coupling the two to double the supply capacity. This solution averages $700, a substantial savings over the cost of a stand-alone installation.

Twin Tanks

Once it's determined that adding a second tank makes sense, there are two basic piping methods that work well: reverse-return and series. Each offers independent operation if one water heater fails or needs servicing. Other incorrect piping methods commonly but erroneously used to add a tank not only perform poorly but may also cause stagnation and ensuing water-quality problems (see Figure 1).

Reverse-return. Reverse-return piping ensures equal draw from two tanks of equal size and capacity (Figure 2, next page). Balanced flow is assured by virtue of the fact that the incoming water's shortest path is the first tank, while the hot water's shortest path is from the second tank, which results in both tanks seeing an equal flow.

Series piping is a must if the tanks aren't the same size (Figure 3, page 3). In most cases, the new tank will be the larger of the two because a 50-gallon tank costs a bit less than 40- and 30-gallon models. However, series piping can have a couple of drawbacks. First, there's a loss of pressure during full flow because of the longer pathway, since all of the hot water must pass through both tanks and their related piping. Second, the first tank in line will always handle the lion's share of the heating, resulting in earlier burnout than the downstream tank.

Double-Duty Flue

Water heater life expectancy averages 10 to 15 years. While standard efficiencies hover around 80%, a few gas-fired models offer up to 99% efficiency. The

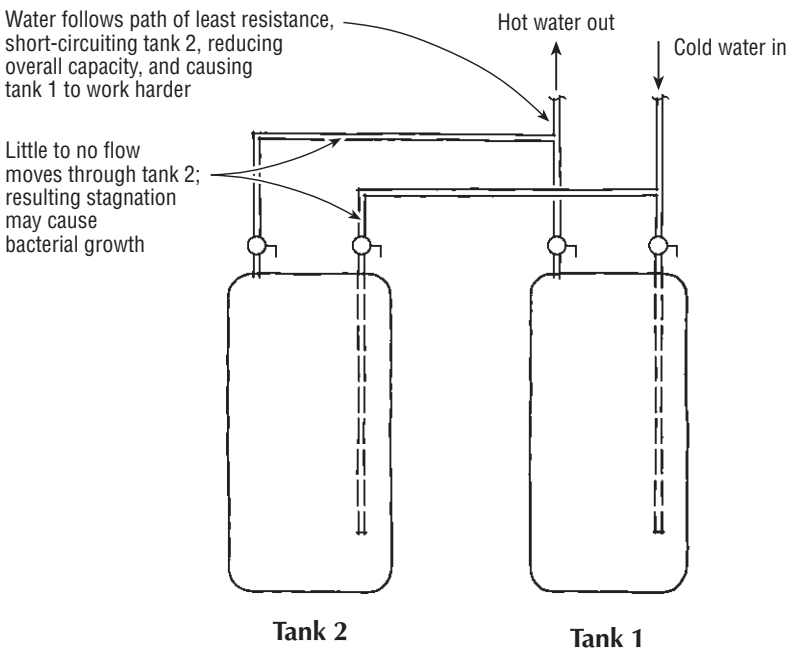

Figure 1. This common but incorrect method of adding a second water heater results in unbalanced flow and stagnation in tank 2.

built-in redundancy of a second tank offers the added luxury of never being without hot water, even if one tank fails. And as energy costs rise, the relatively higher price of an ultra-high-efficiency water heater can represent an excellent return on investment.

But remember, a fossil-fuel water heater requires adequate flue-pipe sizing to effectively vent the carbon monoxide produced. If both the new and existing water heaters must share a flue, the flue size must be increased at the junction by at least one pipe diameter. (Refer to manufacturer's venting requirements and local codes for full compliance.) Generally speaking, the chimney cross-sectional area should be a minimum of 20% larger than the combined cross-sectional area of all appliance flue outlets being served. In an older unlined masonry chimney, a flexible insulated or uninsulated stainless-steel liner (for oil- or gas-fired appliances) or aluminum liner (gas-fired appliances only) should be installed. Flue piping must pitch up from the appliance to the chimney at 1/4 inch per foot and every joint should be securely fastened with a minimum of three stainless-steel self-tapping screws.

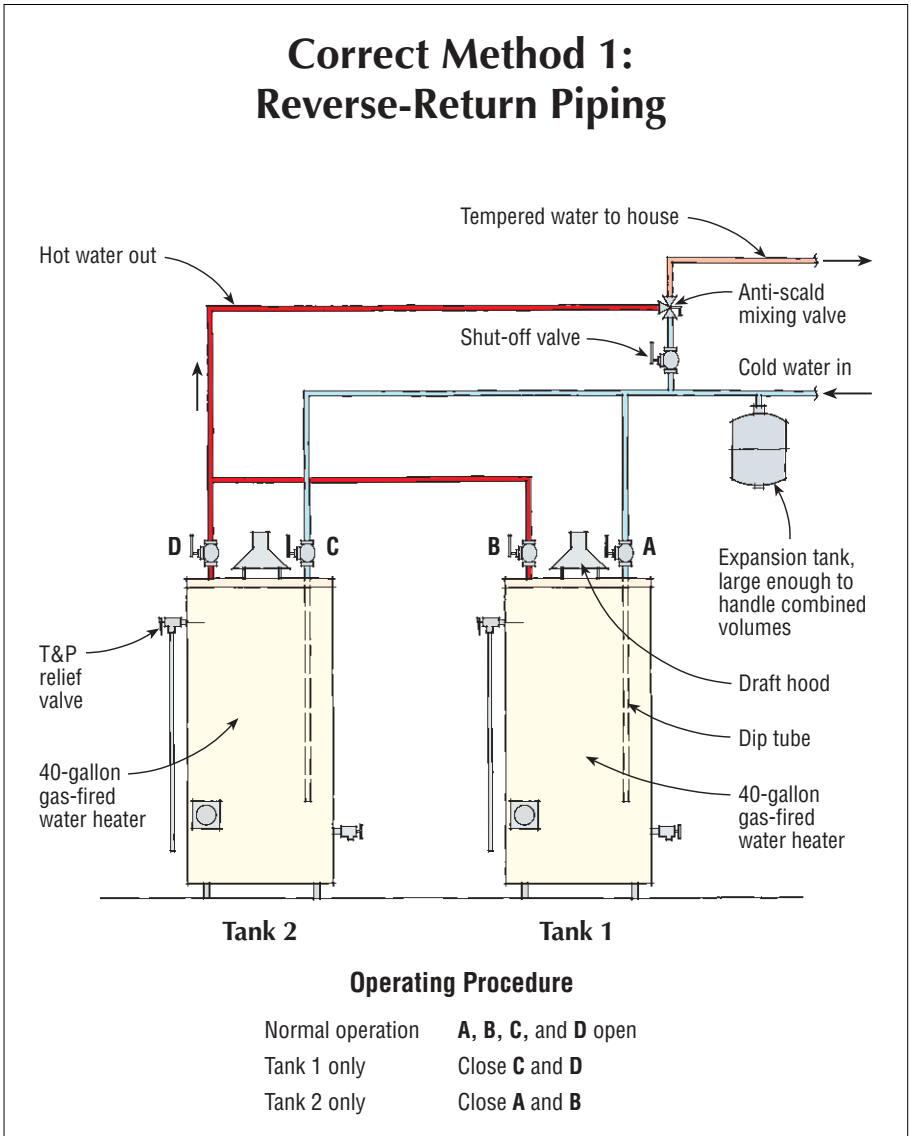

Figure 2. Reverse-return piping ensures balanced flow in two tanks of the same size.

Relief Valve Safety

A relief valve that drips whenever the burner runs indicates that the system is subjected to higher-than-normal pressures. Never plug a dripping relief valve. Water under pressure can be superheated well above the boiling point of 212°F. A powerful explosion can result as that superheated water turns to steam and expands some 1,700 times in volume. The T&P (temperature and pressure) relief valve on each tank should be piped full size (typically 3/4 inch) to within 6 inches of the floor and the piping should not be plastic. Plastic piping is not suitable for use with 210°F water because a sudden discharge of 210°F water can cause it to separate or be dislodged, creating a scalding hazard for anyone nearby. T&P valves will discharge under two conditions: if tank pressure reaches 150 psi, or if water temperature reaches 210°F.

Thermal expansion tanks must be taken into consideration whenever you're installing a hot-water storage tank. Normal water service includes a backflow prevention device or a pressure-reducing valve, which effectively traps water upon entry in the home's piping system. But as water is heated, its volume increases. A 40-gallon water heater supplied by incoming 38°F water can produce a gallon of thermal expansion, so an adequately sized thermal expansion tank is essential to protect the home's plumbing from potential damage.

Twinned heaters can be served by a common expansion tank large enough to handle their combined volumes, or each heater can have its own properly sized expansion tank. These must be rated for potable water and a minimum pressure of 150 psi. Note that standard heating system expansion tanks are rated for a maximum of only 30 psi. Be aware also that thermal

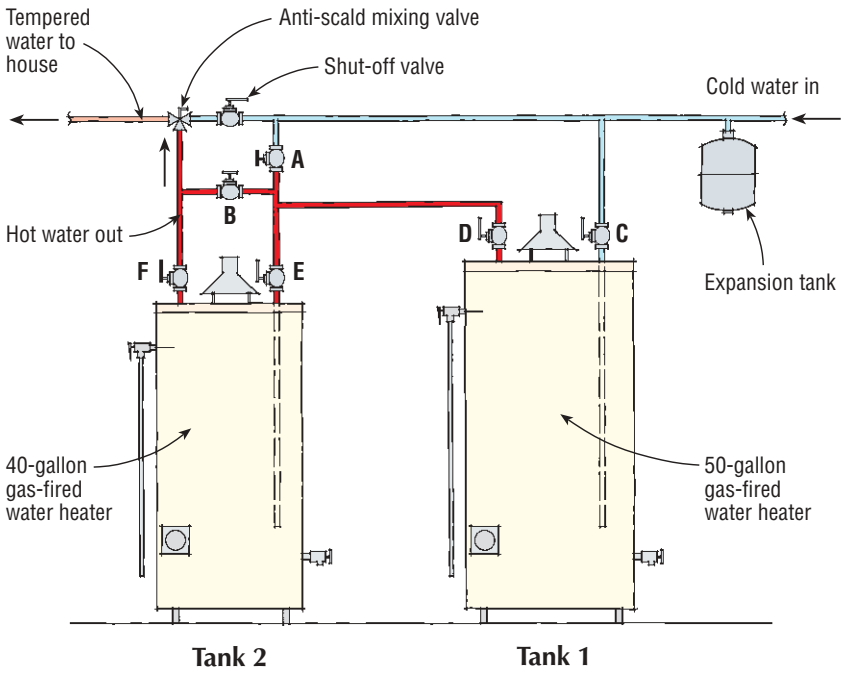

Figure 3. Series piping is called for when the new tank is a different size (usually bigger) than the existing tank.

expansion tank manufacturers may base their sizing requirements on warmer incoming water temperatures and lower finished water temperatures than may be the case, either of which can lead to undersized thermal expansion tanks, a stressed heater, and a dripping relief valve.

A good rule of thumb for sizing thermal expansion tanks is to apply a 1-to-4 ratio in order to minimize pressure spikes. So, if a 40-gallon water heater produces a gallon of thermal expansion, the tank volume should be at least 4 gallons. The majority of potable water thermal expansion tanks are available in a 4.5-gallon volume tank with a factory air-charge of 40 psi. Following installation, that air pressure should be increased to within a few pounds of your incoming municipal or private cold-water pressure.

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KITCHEN SINKS

Hard as Rock. This composite sink line provides a "natural" accompaniment to a stone or solid-surface countertop. Moen claims its *MoenStone Granite sinks* match the natural stone's hard-wearing characteristics with scratch-, chip-, and stain-resistant performance. The single- and double-basin sinks may be drop-in or undermount-installed and are manufactured in five colors: white, ivory, black, blue, and metallic. Prices range from $336 to $624, depending on style and color.

Moen, 800/289-6636; www.moen.com.

Stainless Plus. This cool stand-alone stainless-steel module plays into the mixed-materials countertop trend, eliminates several installation steps, and looks great in a wide variety of style settings. The *AquaCentre 1050* features a single bowl and integral drainboard, two removable tilt trays, and two nicely detailed pull-out storage compartments with integrated sorting baskets. Decorative panels are not included but may be installed to match the surrounding cabinetry. High-end alert: The unit retails for $7,000.

Julien, 800/461-3377, www.julien.ca.

Composite Combo. Here's a great idea that's really practical with solid-surfacing materials. *Swanstone Classics* combines its US-2021 large-bowl and US-1711 small-bowl sinks to make a custom double-basin sink. Add other bowls, and the design prospects are virtually unlimited. The bowls shown retail for about $193 to $574, depending on size and material.

Swan Corporation, 800/325-7008, www.theswancorp.com.

Cast-Iron Sinks. So stated the banner in a store window display in an old cartoon I read as a kid. A character reading the banner asked, "Who don't know that?" Anyway, whether used as an anchor or a kitchen basin, the *Forrester Cast Iron Kitchen Sink* features "super-smooth ion barrier Sana-Gloss glazing," said to be harder than porcelain enamel and to reduce cleaning maintenance. The sink is available in tile-in and self-rimming configurations with optional rack insert ($85) and cutting board ($80). The sink retails for $420 in white and $486 in colors.

Toto USA, 888/295-8134, www.totousa.com.

LAMINATE FLOORING

Convincing Grain. Embossed texture combines with photographically rendered wood grain to make *Modern Accents flooring* a challenge to distinguish from the real thing. Individual plank widths with V-groove edges and built-in water resistance qualify for installation in the best kitchens and bathrooms. The flooring click-locks together without adhesives. Retail prices are determined by distributor, but are around $2 to $5 per square foot, plus cushion pad and transition pieces.

Witex Flooring, 800/948-3987, www.witexusa.com.

Formed Like Stone. With its three-dimensional surface texture and naturalistic coloring, *NatureForm* high-pressure laminate tile creates a convincing and classy floor that resists chips and dents while eliminating the cold feeling and unforgiving hardness of authentic stone. The tile carries a 25-year limited warranty against water damage under normal residential use, even in the bathroom. True to laminate heritage, the tiles snap together without glue. Material prices run approximately $5.30 per square foot.

Mannington Laminate, 800/356-6787, www.mannington.com.

Alternating Widths. Combining $4^{11}/_{16}$- and $6^{11}/_{16}$-inch plank widths makes it possible to blur the giveaway modular look of typical laminate flooring. The *TimberView* line further challenges eye and hand with V-groove edges and a palpable surface texture. Mechanically locking edges promise simple installation without adhesives or special tools. The $^{5}/_{16}$-inch-thick planks are $50^{5}/_{8}$ inches long, shipped in 8-piece, 13.29-square-foot cartons. The flooring sells for about $3.50 to $4 per square foot.

Alloc, 877/362-5562, www.alloc.com.

Stone Tile. Labor-intensive prep and demanding installation requirements are two reasons clients considering a conventional ceramic tile floor may be barking up the wrong tree. *Tap-N-Lock* stone-look laminate tiles have firmly interlocking edges and remain independent of the subfloor, eliminating potential expansion cracks. The "premiere product" Estate Plus tiles measure $15^{3}/_{4}$ inches square and are packaged 9 pieces per carton at a suggested retail price of $4 to $5 per square foot.

Wilsonart Flooring, 800/710-8846, www.wilsonartflooring.com.